

microwave cooking to help overcome this issue. Maltol is a flavour enhancer, occurring naturally in cocoa, coffee beans, and cereals. It does not have a flavour of its own, but modifies inherent flavours in foods. Since the Maillard reaction does not occur to a great extent in the microwave, foods cooked by this method do not develop a dark, deep colour. New combination microwave-convection ovens and innovations in packaging/films can help overcome these browning and colour issues. There are also unique products to help in browning, like Maillöse, a product that provides brown colour without affecting flavour. The browning is heat activated and can help add colour for products that may not be able to achieve browning by conventional methods.

Meeting Trends

The rich, intense flavours associated with brown flavours fit with many current food trends. More new products are being targeted towards older consumers, a population with hefty purchasing power. As people age, they tend to undergo a decline in their ability to taste and smell. These physical changes can cause a desire for foods with bolder, more intense flavours. The younger generation is also demanding bolder, intense flavours. This younger generation is a large marketing target, and food companies are battling to win them over with new and innovative products that will catch their attention and satisfy their taste buds. Brown flavours are one way to offer bolder, rich, complex flavours, without being too dif-

ferent in flavour from what the typical consumers are familiar with. Consumers as a whole are also travelling more frequently, and being exposed to new foods, cuisines, and ingredients. As more people are exposed to these cultures and their foods, and these ingredients become locally available and consumed, the general population's palates are becoming more educated. Many of the ethnic cuisines that are becoming popular, such as Indian cuisine, contain various brown flavour notes. Cooking techniques such as toasting can further increase the brown notes in dishes, and are commonly used in Indian cuisine to create complex and unique flavours. Searing meats, toasting nuts, or dry roasting chile peppers are other methods to create unique and intense flavours

that use caramelisation or the Maillard reaction to derive complex brown flavour notes.

Bolder Profiles

Brown flavours tend to be intense and complex, and these are the types of flavours that fit right into the bolder flavour profiles that are desired by more and more consumers, both young and old. High temperature cooking techniques such as searing, grilling over an open flame, and roasting are also capable of producing intense, rich (and brown) flavours that consumers are clamouring for. Another food trend is combining traditionally sweet flavours in savoury applications (or vice versa). Using brown flavours as an example, the combination of a hot chilli flavour with chocolate in the same application illustrates this trend. It may be a sweet product with a 'new' flavour combination, such as a double chocolate chip cookie with a chipotle kick. Or, it may manifest as a classic savoury dish like a Mexican Chicken Molé, with a spicy chilli sauce enhanced with Mexican chocolate. Sweet flavours combined with brown flavours are also popping up on menus. Beef tenderloin covered with a rub of ground coffee and cinnamon, roasted to perfection is a great example of brown flavours typically used in desserts translated to a savoury dish. These combinations create complex flavours that can add layers and depth to an endless number of dishes.

The complex, deep brown flavours that are developed by various cooking techniques that use caramelisation or the Maillard reaction to create browning can easily be translated to finished products that are manufacturing friendly. Brown flavours also fit into many food trends seen on the market today, as well as trends that are just down the road. ♦

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Flavour Blenders for Functional Beverages

Functional beverages often include ingredients that provide specific health or cosmetic benefits but also contribute a discordant flavour note. Examples of highly flavoured functional ingredients are botanical extracts, amino acids, and B vitamins. Flavour blenders such as malic acid blend together discordant flavour notes to create a smoother, more rounded flavour profile. Well-blended flavour was recently found to be an important attribute in beverage refreshment by a sensory study conducted for a multinational flavour company. When tasting a product with blended flavour, we experience the merging of many different flavour notes into one blended flavour profile. Products with blended flavour are smoother and richer than their unblended counterparts. In the unblended version, the individual flavour notes are readily distinguishable. In the blended version, they are much less so.

Achieving Blended Flavour

There are many ingredients that function as flavour blenders; that is, they merge different flavour notes into one blended flavour. The classic flavour blenders are the brown spices; allspice, cinnamon, clove, and nutmeg. One of the reasons that cola beverages have such a blended flavour is their use of brown spice extracts. Vanilla, another flavour blender, has been the basis of recent cola beverage line extensions. Maltol and ethyl maltol are used as flavour enhancers but also act as flavour blenders. Malic acid enhances fruit flavours as well as blending together flavour notes; as little as 20 ppm of malic acid may be enough to create a smoother flavour profile in enhanced waters.

Amphiphilic

At the molecular level, these flavour blenders share a common property in that they are all amphiphilic; that is, they have both a hydrophilic region and a hydrophobic region. Malic acid has three possible molecular configurations. At neutral pH, the trans configuration predominates due to mutual repulsion between the ionised carboxyl groups. At lower pHs, the gauche minus rotamer predominates. This configuration is amphiphilic – it has both a hydrophobic and a hydrophilic region. The transport of some flavour compounds through the saliva is delayed as a result of hydrophobic association between these flavour compounds and a flavour blender. This in turn results in the sensory system being exposed to the flavour compounds over a longer time period and in a less orderly sequence – the brain interprets this as more blended flavour.

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